

To end hunger, science must change its focus

Policymakers need research on ways to end hunger. But a global literature review finds most research has had the wrong priorities.

How can research help to end hunger? One way to answer this question is to assess published research on hunger, and determine which interventions can make a difference to the lives of the 690 million people who go hungry every day.

That's what an international research consortium called Ceres2030 has been doing¹. And the results of its 3-year effort to review more than 100,000 articles are published this week across the Nature Research journals² (see go.nature.com/3djmpqq). The consortium's findings – coming just days after this year's Nobel Peace Prize was awarded to the World Food Programme – are both revealing and concerning.

The team was able to identify ten practical interventions that can help donors to tackle hunger, but these were drawn from only a tiny fraction of the literature. The Ceres2030 team members found that the overwhelming majority of agricultural-research publications they assessed were unable to provide solutions, particularly to the challenges faced by smallholder farmers and their families.

The World Food Programme is the United Nations' primary agency in the effort to eliminate hunger, which includes the flagship Sustainable Development Goal (SDG) to end hunger by 2030.

The researchers found many studies that conclude that smallholders are more likely to adopt new approaches – specifically, planting climate-resilient crops – when they are supported by technical advice, input and ideas, collectively known as extension services.

Other studies found that these farmers' incomes increase when they belong to cooperatives, self-help groups and other organizations that can connect them to markets, shared transport or shared spaces where produce can be stored³. Farmers also prosper when they can sell their produce informally to small- and medium-sized firms⁴.

There was one finding, however, that surprised and troubled the Ceres2030 team. Two-thirds of people who are hungry live in rural areas. Of some 570 million farms in the world, more than 475 million are smaller than 2 hectares. Rural poverty and food insecurity go hand in hand, and yet the Ceres2030 researchers found that the overwhelming majority of studies they assessed – more than 95% – were not relevant to the needs of smallholders and their families. Moreover, few studies included original data. One paper

“Of some 570 million farms in the world, more than 475 million are smaller than 2 hectares.”

from the Ceres2030 team's findings includes the striking statement that “most of the included studies only involved researchers without any participation from farmers”⁵.

So why aren't more researchers answering more practical questions about ending hunger that are relevant to smallholder farmers? Many of the reasons can be traced to the changing priorities of agricultural-research funding.

During the past four decades, funding provision for this type of research has been shifting towards the private sector, with more than half of funding now coming from agribusinesses, according to the work of Philip Pardey, who researches science and technology policy at the University of Minnesota in Saint Paul, and his colleagues⁶.

Small is less desirable

At the same time, applied research involving working with smallholder farmers and their families doesn't immediately boost an academic career. Many researchers – most notably those attached to the CGIAR network of agricultural research centres around the world – do work with smallholders. But in larger, research-intensive universities, small is becoming less desirable. Increasingly, university research-strategy teams want their academics to bid for larger grants – especially if a national research-evaluation system rewards those who bring in more research income.

Publishers also bear some responsibility. Ceres2030's co-director, Jaron Porciello, a data scientist at Cornell University in Ithaca, New York, told *Nature* that smallholder-farming research might not be considered sufficiently original, globally relevant or world-leading for journal publication. This lack of a sympathetic landing point in journals is something that all publishers must consider in the light of the Ceres2030 team's findings.

The Ceres2030 collaboration is to be congratulated for highlighting these issues. The group had two funders, the Bill & Melinda Gates Foundation in Seattle, Washington, and the German Federal Ministry for Economic Cooperation and Development. Both have pledged extra funding to the intergovernmental Global Agriculture and Food Security Program, which channels money from international donors to smallholder farmers. This is important, but doesn't fully address Ceres2030's overarching finding: that most research on hunger is of little practical use in the goal to make hunger a thing of the past.

National research agencies, too, need to listen, because they are the major funding source for researchers at universities. Achieving the SDG to end hunger will require an order of magnitude more research engagement with smallholders and their families. Their needs – and thus the route to ending hunger – have been neglected for too long.

1. Laborde, D., Porciello, J. & Smaller, C. *Ceres2030: Sustainable Solutions to End Hunger* (Ceres2030, 2020).
2. *Nature Plants* <https://doi.org/10.1038/s41477-020-00795-9> (2020).
3. Bizikova, L. et al. *Nature Food* <https://doi.org/10.1038/s43016-020-00164-xX> (2020).
4. Liverpool-Tasie, L. S. O. et al. *Nature Sustain.* <https://doi.org/10.1038/s41893-020-00621-2> (2020).
5. Stathers, T. et al. *Nature Sustain.* <https://doi.org/10.1038/s41893-020-00622-1> (2020).
6. Pardey, P. G., Chan-Kang, C., Dehmer, S. P. & Beddow, J. M. *Nature* **537**, 301–303 (2016).